

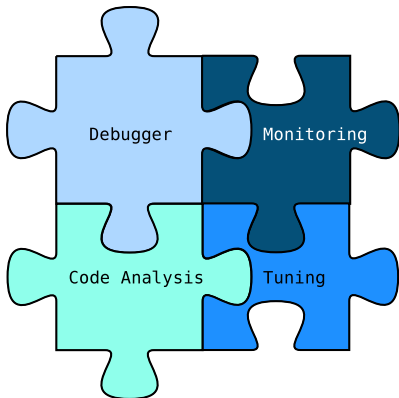
Eclipse Parallel Tools Platform (PTP)

May 17, 2013 | Carsten Karbach, JSC/Jülich Supercomputing Centre

PTP – Parallel Tools Platform

What is PTP?

- **IDE** for parallel application development
- Based on **Eclipse**
- **Open-source** project
- Developers:
IBM, U.Oregon, UTK,
Heidelberg University,
NCSA, UIUC, JSC, ...

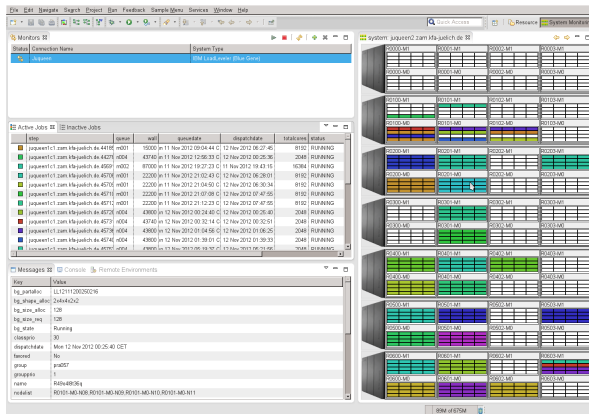


PTP – Features

- Supports **entire development lifecycle**: coding, build, job submission, debugging, monitoring
- **Revision control** integration: CVS, SVN, Git
- Content assistance and context sensitive help
- **Multi-language** support: C/C++/Fortran
- **Uniform interface** to various batch systems: LoadLeveler, LSF, PBS, SLURM, Torque
- Authentication/Communication to remote system via **SSH**

Monitoring

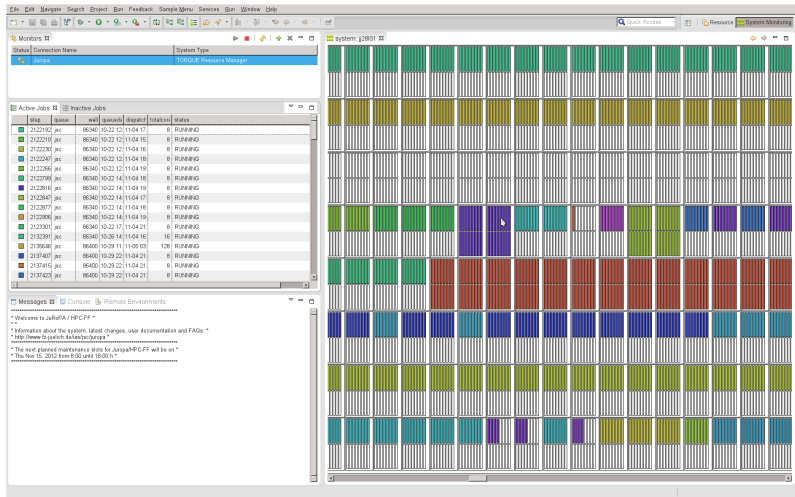
- Display current status of supercomputer, based on LLview
- Jobs, compute nodes, system architecture



Monitoring example: JUQUEEN

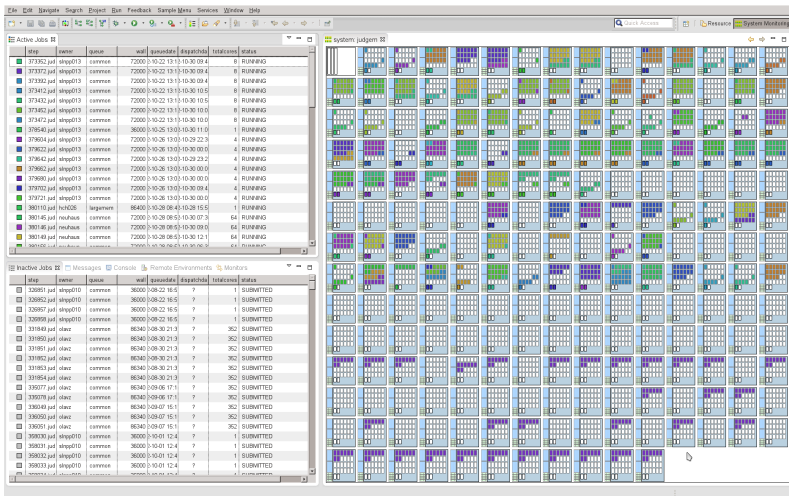
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Monitoring Example: JUROPA



Torque/Moab, 3288 nodes, Intel Xeon Nehalem

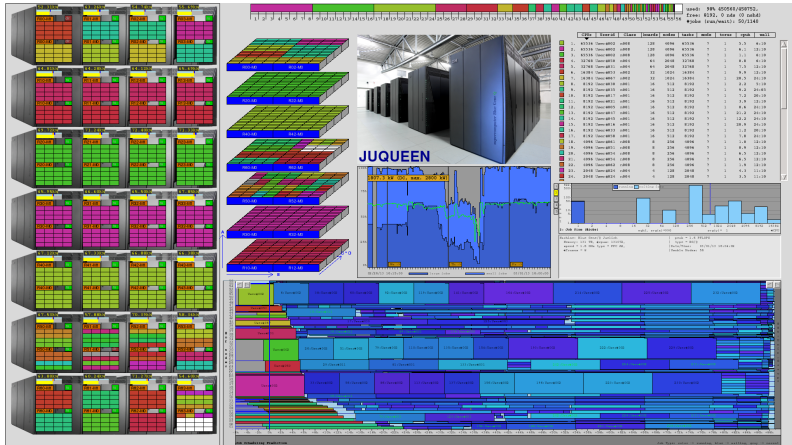
Monitoring Example: JUDGE



Torque/Moab, 206 nodes, Intel Xeon Westmere, NVIDIA Tesla GPUs

LLview

→ Visualizes supercomputer status on a single screen

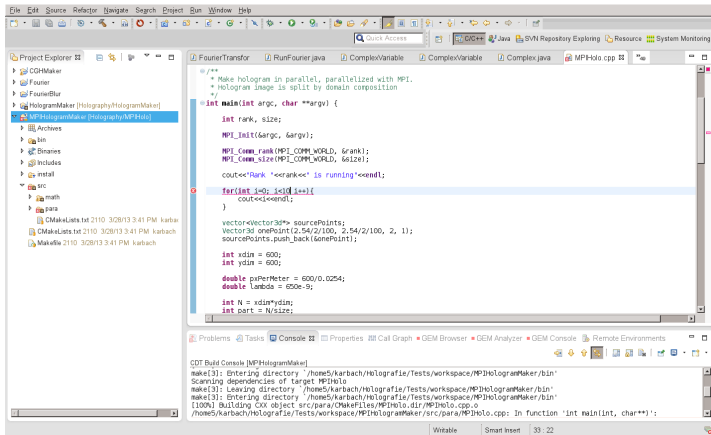


Source: Screenshot LLview for JUQUEEN

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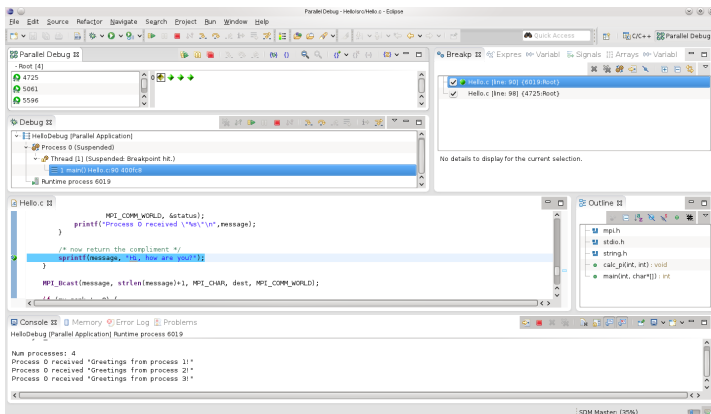
Code Analysis

- Code analysis as you type, on build
- Auto-completion, refactoring for C/C++ and Fortran



Parallel Debugger

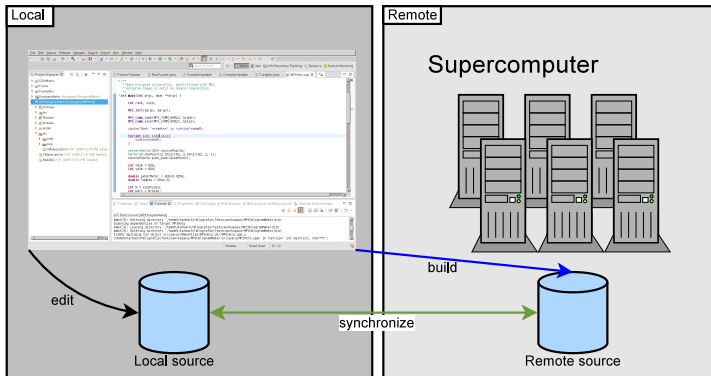
- Debugging of OpenMPI Applications
- Uses Scalable Debug Manager (SDM) and GNU Project Debugger (gdb)



Performance Analysis and Tuning

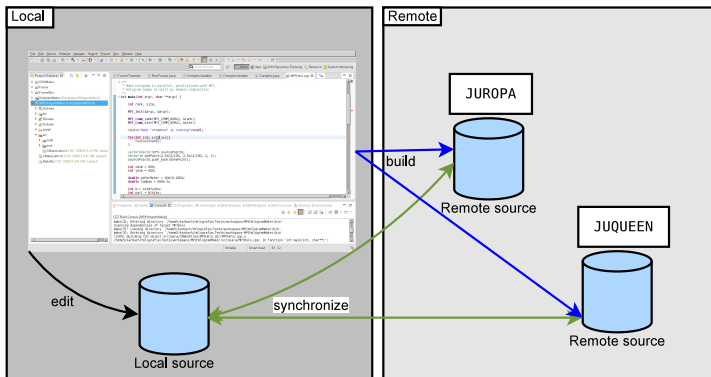
- Integration of Tuning and Analysis Utilities (**TAU**) into PTP job submission
- Automatic **instrumentation** of your application
- Job submission via PTP
- Attached **analyse** step for visualization of performance data
- Abstraction for integration of external tools in External Tools Framework (ETFw)

Synchronized Projects I



- Local source files, edited via Eclipse
- Transparent **bidirectional** synchronization with remote project location

Synchronized Projects II



- Synchronization to **multiple** hosts
- Single source

Job submission

Name: HelloWorld

Resources Application Arguments Environment Synchronize Common

Target System Configuration: de.fz-juelich.europa.torque.batch

Connection name: Europa New...

Basic Settings Advanced Settings Import MSUB Script

Name	Value	Description
Job Name:	ptp_job	The name assigned to the job by the qsub or qalt
Account:		Account to which to charge this job.
Queue:		Designation of the queue to which to submit the j
Number of nodes:	1	Number and/or type of nodes to be reserved for e
Total Memory Needed:		Maximum amount of memory used by all concun
Wallclock Time:	00:10:00	Maximum amount of real time during which the jc
MPI Command:	mpirexec	Which mpi command to use.
Processes per Node:	5	Processes per node (ppn value)
Threads per Task:	1	Number of threads per task (tpt value)
MPI Number of Tasks:	5	The '-np' value (Should match with nodes*ppn/tpt
Export Environment:	<input checked="" type="checkbox"/>	All variables in the qsub command's environment

View Script View Configuration Restore Defaults

Using Parallel Application Launcher - [Select other...](#)

Apply Revert

Run Close

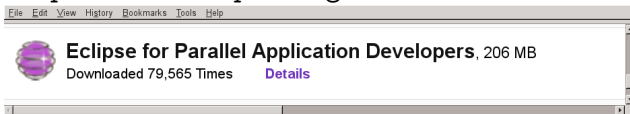
- Configure job submission via GUI
- Lists all available parameters
- **Automatic** batch script generation
- Supports LoadLeveler, LSF, PBS, SLURM, Torque

Tutorials

- Step by step tutorials available for
 - JUQUEEN → <http://www.fz-juelich.de/SharedDocs/Downloads/IAS/JSC/EN/PTP/JSCPTPJunqueen.html>
 - JUROPA → <http://www.fz-juelich.de/SharedDocs/Downloads/IAS/JSC/EN/PTP/JSCPTPJuropa.html>
 - JUDGE → <http://www.fz-juelich.de/SharedDocs/Downloads/IAS/JSC/EN/PTP/JSCPTPJudge.html>
- More detailed, but generic tutorials at
<http://wiki.eclipse.org/PTP/tutorials>

Download and Install

- **Prerequisites** are Windows/Mac/Linux, Java JRE 1.6 or higher
- Download PTP from <http://www.eclipse.org/downloads/>



- Unzip and run PTP distribution

```
tar -xvf eclipse-parallel-juno-<OS>-<version>.tar.gz  
./eclipse/eclipse
```

Contact

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- **JSC-PTP tutorials** →
<http://www.fz-juelich.de/SharedDocs/Downloads/IAS/JSC/EN/PTP/JSCPTPJunqueen.html>
- **PTP Wiki** → <http://wiki.eclipse.org/PTP>
- **PTP Download** → <http://www.eclipse.org/downloads>
- **LLview** → <http://www.fz-juelich.de/jsc/llview>